

WHAT IS CLAIMED IS:

1. A method of manufacturing a multi-layer printed wiring board comprising an internal layer circuit forming step, a outer layer circuit forming step, and a solder resist forming step, wherein the internal layer circuit forming step and the outer layer circuit forming step comprise steps of:

coating the surface of a board coated with a patterning material with a photosensitive film;

exposing the photosensitive film according to a predetermined conductive pattern;

forming an etching resist by removing a portion of the photosensitive film which is not exposed from the board;

removing the patterning material from the board according to the etching resist; and

removing the etching resist from the board, and

the solder resist forming step comprises steps of:

coating the surface of the board subjected to the outer layer circuit forming step with a photosensitive solder resist material;

coating the solder resist material with a photosensitive film;

forming a light shielding mask by irradiating a laser beam on the photosensitive film according to a formed pattern of the solder resist;

exposing the solder resist material by using the light shielding mask;

removing the light shielding mask; and

removing the solder resist material which is not exposed due to the light shielding mask.

Sub 1 2. A method of manufacturing a multi-layer printed wiring board according to claim 1, wherein the laser beam has an output or a wavelength range such that the photosensitive film is exposed but the solder resist material is not exposed.

3. A method of manufacturing a multi-layer printed wiring board according to claim 1, wherein the photosensitive film forms the light shielding mask such that a portion on which the laser beam is irradiated is transformed to have such a nature that ultraviolet rays are shielded, and

the ultraviolet rays are irradiated on the solder resist material through the light shielding mask in the exposure step.

4. A method of manufacturing a multi-layer printed wiring board according to claim 2, wherein the photosensitive film forms the light shielding mask such that a portion on which the laser beam is irradiated is transformed to have such a nature that ultraviolet rays are shielded, and

the ultraviolet rays are irradiated on the solder resist material through the light shielding mask in the exposure step.

Sub 2 5. A method of manufacturing a multi-layer printed wiring board according to claim 1, further comprising a marking step comprising steps of:

coating a position to be subjected to marking on a board surface subjected to the solder resist forming step with a photosensitive marking material;

coating the marking material with a photosensitive film;

forming a light shielding mask by irradiating a laser beam on the marking material according to marked information;

exposing the marking material by using the light shielding mask;

removing the light shielding mask; and

removing the marking material which is not exposed due to the light shielding mask.

6. A method of manufacturing a multi-layer printed wiring board according to claim 2, further comprising a marking step comprising steps of:

coating a position to be subjected to marking on a board surface subjected to the solder resist forming step with a photosensitive marking material;

coating the marking material with a photosensitive film;

forming a light shielding mask by irradiating a laser beam on the marking material according to marked information;

exposing the marking material by using the light shielding mask;

removing the light shielding mask; and

removing the marking material which is not exposed due to the light shielding mask.

7. A method of manufacturing a multi-layer printed wiring board according to claim 3, further comprising a marking step comprising steps of:

coating a position to be subjected to marking on a board surface subjected to the solder resist forming step with a photosensitive marking material;

coating the marking material with a photosensitive film;  
forming a light shielding mask by irradiating a laser beam  
on the marking material according to marked information;  
exposing the marking material by using the light shielding  
mask;  
removing the light shielding mask; and  
removing the marking material which is not exposed due to  
the light shielding mask.

8. A method of manufacturing a multi-layer printed wiring  
board according to claim 1, further comprising a marking step  
comprising steps of:

coating a position to be subjected to marking on a board  
surface subjected to the solder resist forming step with a  
photo-hardening marking material;

irradiating a laser beam on the marking material according  
to marked information; and

removing the marking ink except for the marking ink on a  
portion where the marking ink is hardened by irradiation of the  
laser beam.

9. A method of manufacturing a multi-layer printed wiring  
board according to claim 2, further comprising a marking step  
comprising steps of:

coating a position to be subjected to marking on a board  
surface subjected to the solder resist forming step with a  
photo-hardening marking material;

irradiating a laser beam on the marking material according  
to marked information; and

removing the marking ink except for the marking ink on a portion where the marking ink is hardened by irradiation of the laser beam.

10. A method of manufacturing a multi-layer printed wiring board according to claim 3, further comprising a marking step comprising steps of:

coating a position to be subjected to marking on a board surface subjected to the solder resist forming step with a photo-hardening marking material;

irradiating a laser beam on the marking material according to marked information; and  
removing the marking ink except for the marking ink on a portion where the marking ink is hardened by irradiation of the laser beam.

11. A method of manufacturing a multi-layer printed wiring board according to claim 1, further comprising a marking step comprising steps of:

coating a position to be subjected to marking on a board surface subjected to the solder resist forming step with a photo-softening marking material;

irradiating a laser beam on the marking material according to marked information; and

removing the marking ink except for the marking ink on a portion where the marking ink is softened by irradiation of the laser beam.

12. A method of manufacturing a multi-layer printed wiring board according to claim 2, further comprising a marking

step comprising steps of:

coating a position to be subjected to marking on a board surface subjected to the solder resist forming step with a photo-softening marking material;

irradiating a laser beam on the marking material according to marked information; and

removing the marking ink except for the marking ink on a portion where the marking ink is softened by irradiation of the laser beam.

13. A method of manufacturing a multi-layer printed wiring board according to claim 3, further comprising a marking step comprising steps of:

coating a position to be subjected to marking on a board surface subjected to the solder resist forming step with a photo-softening marking material;

irradiating a laser beam on the marking material according to marked information; and

removing the marking ink except for the marking ink on a portion where the marking ink is softened by irradiation of the laser beam.

14. A method of manufacturing a multi-layer printed wiring board according to claim 1, wherein the method is applied to a multi-layer printed wiring board which is manufactured by a flexible manufacturing system.

15. A method of manufacturing a multi-layer printed wiring board according to claim 2, wherein the method is applied to a multi-layer printed wiring board which is manufactured by

a flexible manufacturing system.

16. A method of manufacturing a multi-layer printed wiring board according to claim 3, wherein the method is applied to a multi-layer printed wiring board which is manufactured by a flexible manufacturing system.

21B1 17. A method of manufacturing a multi-layer printed wiring board according to claim 1, wherein, in the internal layer circuit forming step and the outer layer circuit forming step, an etching resist is formed by using the same laser irradiation device as the laser irradiation device used to form a light shielding mask in the solder resist forming step.

18. A method of manufacturing a multi-layer printed wiring board according to claim 8, wherein photosensitive films of the same type are used in the internal layer circuit forming step, the outer layer circuit forming step, and the solder resist forming step.

19. A method of manufacturing a multi-layer printed wiring board according to claim 4, wherein, in the marking step, a light shielding mask for the marking step is formed by using the same laser irradiation device as the laser irradiation device used to form a light shielding mask in the solder resist forming step.